

DISTOCAMBARUS (FITZCAMBARUS) CARLSONI,
A NEW SUBGENUS AND SPECIES OF CRAYFISH
(DECAPODA: CAMBARIDAE) FROM
SOUTH CAROLINA

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Abstract.—A new subgenus, *Fitzcambarus*, is proposed to receive *Distocambarus (Fitzcambarus) carlsoni*, the third species assigned to the genus. This crayfish, differing from its relatives in possessing a comparatively narrow areola, has been found in a single locality in the Saluda River basin of Anderson County, South Carolina. Like its congeners, it is a primary burrower and shares a swamp-seepage area with the crayfish *Cambarus (Jugicambarus) carolinus* (Erichson), the only primary burrower previously reported from the basin.

The crayfish described here was discovered in burrows constructed in a swampy area bordering a tributary to the Saluda River in Anderson County, South Carolina. Late in the afternoon of 27 April 1982, after having collected crayfishes in a small sand and silt bottomed stream, I discovered burrows in the adjoining swamp. The only burrowing crayfish that I had encountered previously in the upper Saluda Basin was *Cambarus (Jugicambarus) carolinus* (Erichson, 1846), and I anticipated that this was the crayfish responsible for the piles of earth scattered over the swamp floor. Because of the densely matted roots just beneath the surface of the ground, attempts to excavate two of the burrows resulted in failure to obtain an adult individual, but a very small juvenile was retrieved from one of them. The specimen was brought into the laboratory where it was found to belong to an unknown species. My friend Paul H. Carlson was advised of the find, and he visited the locality in May when he obtained several representatives of *C. (J.) carolinus*. Another attempt by him to obtain additional specimens of the new crayfish was made in June when he succeeded in securing several specimens; however, not until early in November, when both of us spent the better part of seven hours digging in the swamp, was an adequate series, including two first form males obtained by Dr. Carlson, acquired for preparing this description.

This crayfish is named in honor of Dr. Carlson, of the South Carolina Department of Health and Environmental Control, in token of his indefatigable efforts in sampling so many burrowing crayfish populations occurring in South Carolina.

Reasons for proposing the recognition of subgenera in the genus *Distocambarus* are pointed out in the discussion of "Relationships" below. Diagnoses and the compositions of the subgenera are as follows:

Genus *Distocambarus* Hobbs, 1981
Subgenus *Distocambarus*

Diagnosis.—Areola no more than 14 times as long as wide; mesial margin of palm of chela of male longer than maximum width of podomere and at least as long as carpus; terminal elements of first pleopod of first form male directed

caudodistally, central projection platelike and comparatively short; annulus ventralis movable through arc of 90 degrees, and postannular sclerite large, subtrapezoidal, and almost as long as annulus.

Species.—*Distocambarus (Distocambarus) devexus* (Hobbs, 1981:302) and *Distocambarus (Distocambarus) crockeri* Hobbs and Carlson, 1983:421.

Fitzcambarus, new subgenus

Diagnosis.—Areola at least 15 times as long as wide; mesial margin of palm of chela of male shorter than wide and shorter than carpus; terminal elements of first pleopod of first form male directed caudally, central projection bladelike and comparatively long; annulus ventralis movable through arc of less than 50 degrees, and postannular sclerite small, subovate in outline, wedge-shaped, and distinctly shorter than annulus.

Gender.—Masculine.

Type-species.—*Distocambarus (Fitzcambarus) carlsoni* new species.

Etymology.—This name is derived from the surname Fitzpatrick and the crayfish genus *Cambarus*. I am pleased to propose this taxon honoring Joseph F. Fitzpatrick, Jr., a friend and an able student of crayfishes who has added much to our knowledge of the Cambaridae.

Distocambarus (Fitzcambarus) carlsoni, new species

Fig. 1

Diagnosis.—In addition to characters cited for genus, rostrum broadly acuminate, margins little thickened and devoid of spines or tubercles. Cephalic extremity of postorbital ridge merging almost imperceptibly with carapace. Suborbital angle obtuse and inconspicuous. Cervical spine lacking. Areola 15.2 to 38 times as long as wide, comprising 38.1 to 41.1 percent of entire length of carapace (43.7 to 47.3 percent of postorbital carapace length) and never with more than 1, often none, punctuation in narrowest part. Chela with well defined row of 5 to 7 tubercles on mesial surface of palm, additional row flanking it dorsolaterally and 2 or 3 tubercles distoventrally. No tubercle on basis of third pereopod opposing hook on ischium.

Holotypic male, form I: Cephalothorax (Fig. 1*a, m*) subcylindrical; maximum width of carapace slightly greater than height at caudodorsal margin of cervical groove (13.2 and 12.3 mm). Abdomen distinctly narrower than thorax (9.6 and 13.2 mm). Areola 38.3 times as long as wide, with room for no more than 1 punctuation across narrowest part. Cephalic section of carapace about 1.4 times as long as areola, latter comprising 41.1 percent of total length of carapace (47.3 percent of postorbital carapace length). Surface of carapace mostly punctate, few tubercles present in hepatic region and in anteroventral branchiostegal region. Rostrum broad and short, gently rounded apically with small, poorly delimited acumen reaching base of distal podomere of antennular peduncle; margins not conspicuously thickened; upper surface shallowly concave with usual submarginal punctations and moderately large ones posteriorly. Subrostral ridge weak but clearly defined. Suborbital angle broadly obtuse, very weak. Postorbital ridge moderately well developed but merging insensibly with carapace cephalically. Branchiostegal and cervical spines absent.

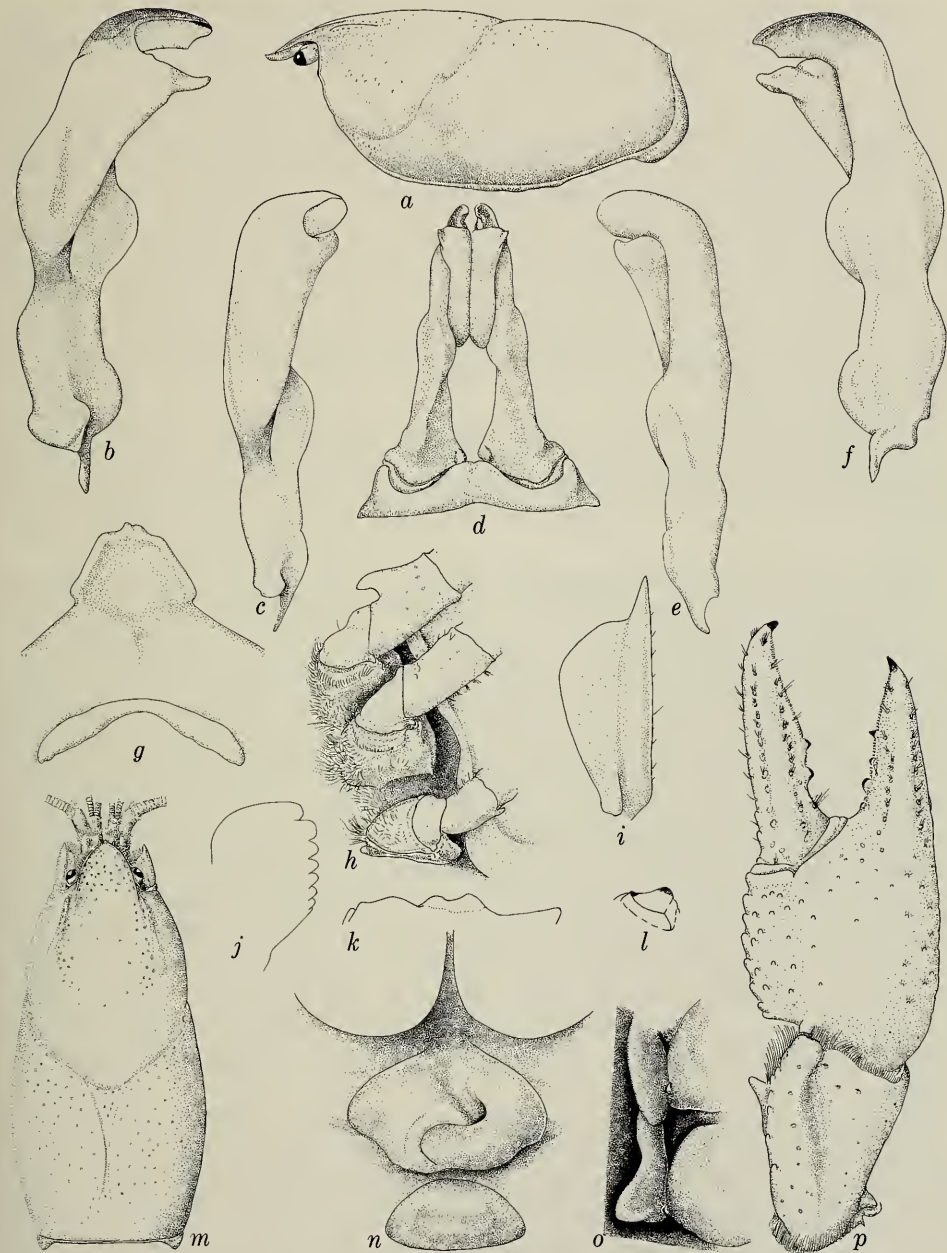


Fig. 1. *Distocambarus (F.) carlsoni* (all from holotype except *c, e* from morphotype, *i-l* from paratype female, and *n* from allotype): *a*, Lateral view of carapace; *b, c*, Mesial view of first pleopod; *d*, Caudal view of first pleopods; *e, f*, Lateral view of first pleopod; *g*, Epistome; *h*, Proximal podomeres of third, fourth, and fifth pereiopods; *i*, Antennal scale; *j*, Incisor lobe of mandible; *k, l*, Molar lobe of mandible; *m*, Dorsal view of carapace; *n*, Annulus ventralis and adjacent sternites; *o*, Denuded ventrolateral parts of sternum and ventral articular regions of left third and fourth pereiopods showing distinctly produced posteroventral lobe on latter; *p*, Dorsal view of distal podomeres of cheliped.

Abdomen shorter than carapace (22.8 and 28.0 mm). Pleura of second through fifth abdominal segments rounded ventrally, lacking caudoventral angle. Cephalic section of scabrous telson with 2 spines (more mesial one movable) in each caudolateral corner. Cephalic lobe of epistome (Fig. 1g) subtrapezoidal, cephalic part truncate with small asymmetrical median projection, margins weakly elevated ventrally; main body of epistome with triangular median depression but lacking distinct fovea; epistomal zygoma broadly arched. Ventral surface of proximal podomere of antennular peduncle with heavy short spine distal to midlength. Antennal peduncle without tubercles and spines on basis and ischium; flagellum with distalmost articles lacking, but almost reaching midcaudal margin of carapace. Antennal scale (Fig. 1i) about 2.5 times as long as broad, widest slightly distal to midlength; greatest width of lamellar area about 1.5 times that of thickened lateral part.

Third maxilliped extending as far anteriorly as antennal peduncle; mesial sector of ventral surface of ischium with clusters of stiff, long setae some of which flanked laterally by shorter, plumose ones; latter also present in lateral sector where conspicuous in submarginal lateral row; merus with setae similarly disposed.

Right chela (Fig. 1p) subelliptical in section, rather strongly depressed; palm 1.4 times as broad as length of mesial margin; length of latter one-third that of entire length of chela; almost entire surface of palm with squamous to subsquamous tubercles. Mesial margin of palm with row of 7 tubercles flanked dorsolaterally by row of 4 (right) or 5 (left) and few additional ones. Both fingers with well defined dorsomedian ridges flanked by setiferous punctations. Opposable margin of fixed finger with row of 3 (left with 4) tubercles, second from base largest, along proximal two-fifths of finger and single row of minute denticles extending between and distal to tubercles from base of finger to corneous tip; acute tubercle also present slightly below row at about midlength of finger; lateral margin of finger weakly costate with row of punctations. Opposable margin of dactyl with 2 tubercles, more distal larger, on proximal half of finger interrupting single row of minute denticles extending from proximal base of proximalmost tubercle to corneous tip of finger, basal half of margin shallowly excavate; mesial margin of dactyl with row of 3 tubercles proximally followed by series of setiferous punctations, tubercles decreasing in size and becoming more squamous distally.

Carpus of cheliped distinctly longer than mesial margin of palm of chela (8.6 and 5.8 mm), with shallow sinuous furrow extending almost entire length of podomere, dorsal surface of which sparsely punctate; mesial surface with dorsal row of 5 or 6 small tubercles, below them 6 or 7 additional ones, distalmost of which conspicuous; prominent tuft of plumose setae situated distomesially; distoventral margin of carpus with 2 tubercles, larger, more lateral one bearing articular socket receiving ventrolateral condyle on propodus.

Merus with usual tubercles dorsally, 3 distal tubercles somewhat larger than others; mesial and lateral surfaces rather smooth; ventral surface with crowded tubercles, mesial row consisting of 11 tubercles, and less regular lateral row of 10 or 11. All tubercles on merus comparatively small, and none spiniform. Ischium with 1 well defined tubercle proximomesially and 2 or 3 vestigial ones distal to it.

Hook on ischium of third pereopod (Fig. 1*h*) simple and acute, overreaching basioischial articulation, not opposed by strong tubercle on basis. Coxa of neither fourth nor fifth pereopod with boss; ventral membrane of coxa of fifth conspicuously setose.

Sternum between third pereopods rather shallow; that between both fourth and fifth comparatively deep, ventrolateral elements corresponding to third and fourth produced ventrally much beyond articulation with respective coxae; that associated with fourth very strong, subtriangular, and curved ventromesially (Fig. 1*o*). Plumose pubescence associated with sternum and coxae of all pereopods very prominent.

First pleopods (Fig. 1*b, d, f*) symmetrical, not contiguous at base, reaching coxae of third pereopods, bearing strong caudoproximal lobe and broadly rounded proximomedian lobe, flexed caudally slightly distal to midlength, and lacking subapical setae. Terminal elements limited to mesial process and central projection, directed caudolaterally and caudomesially, respectively, at about 90 degrees to axis of proximal half of appendage; mesial process non-corneous, tapering, and reaching almost as far caudally as corneous, bladelike central projection which provided with subapical notch.

Uropods with both lobes of proximal podomere bearing acute spines; mesial ramus with distomedian spine small and situated distinctly premarginally.

Allotypic female: Differing from holotype, other than in secondary sexual features, in following respects: areola 23.4 times as long as wide; cephalic section of carapace 1.5 times as long as areola, latter comprising 39.9 percent of total length of carapace (45.7 percent of postorbital carapace length); chela proportionately smaller than that in male, mesial margin of palm with row of 6 (right) or 8 (left) tubercles flanked dorsolaterally by row of 6; opposable margin of fixed finger with row of 3 tubercles, that of dactyl also with 3, second from base largest; mesial margin of dactyl with longitudinal row of 3 (left) or 4 (right) tubercles basally, row flanked by 2 tubercles proximoventrally; distal tubercle in ventromesial row on merus of cheliped subspiniform; 3 tubercles on ventromesial margin of ischium of cheliped better developed than those in holotype. (See Table 1.)

Sternum between fourth pereopods with very narrow median fissure (expanding anteriorly and posteriorly) extending entire length.

Annulus ventralis (Fig. 1*n*) hinged cephalically (moving through arc of some 30 degrees), approximately 1.4 times as broad as long; elevated lateral areas separated by sinistrally disposed depression, latter broad anteriorly, gradually narrowing posteriorly, and terminating in fossa situated sinistral to median line slightly posterior to midlength of annulus; sinus, originating in fossa, coursing dextrally across median line before forming broad arc caudosinistrally and ending on caudal wall of annulus slightly dextral to median line.

Postannular sclerite ovate, 0.7 as wide and 0.5 as long as annulus; central area elevated (ventrally) with anterior face of elevation plane and posterior surface rounded.

Morphotypic male, form II: Except in secondary sexual characters, differing in no conspicuous way from holotype; few differences noted, probably reflecting juvenile condition of specimen: anterior section of telson with only 1 spine in each caudolateral corner; cheliped with fewer well developed tubercles on merus and carpus, and lateral lobe of proximal podomere of uropod without well defined

Table 1.—Measurements (mm) of *Distocambarus (F.) carlsoni*.

	Holotype	Allotype	Morphotype
Carapace			
Entire length	28.0	29.3	21.9
Postorbital length	24.3	25.6	18.8
Width	13.2	14.2	9.6
Height	12.3	12.5	9.0
Areola			
Width	0.3	0.5	0.4
Length	11.5	11.7	8.3
Rostrum			
Width	4.6	4.6	3.6
Length	4.5	4.6	3.7
Chela			
Length, palm mesial margin	5.8	5.4	3.6
Palm width	8.2	7.5	4.8
Length, lateral margin	17.6	15.7	11.2
Dactyl length	10.5	9.6	7.1
Abdomen			
Width	9.6	10.5	6.9
Length	22.8	24.5	16.0
Carpus of cheliped			
Width	5.7	5.4	3.6
Length	8.6	8.5	5.6

spine. Ischium of third pereopod with only rudiment of prominent hook in holotype, but produced posteroventral lobe of ventrolateral element of sternum corresponding to fourth pereopod clearly evident. First pleopod (Fig. 1c, e) lacking strong caudal flexure near midlength; central projection non-corneous, and both terminal elements bent caudally at about 90 degrees to shaft, but shorter, less sharply delimited, and distal parts more inflated than in holotype.

Color notes.—Dorsum of carapace brown with reddish or greenish suffusion. Lateral rostral carinae, postorbital ridges, and small lateral spot on posterior margin of cervical groove very dark, almost black. Dark dorsum of thoracic region abruptly replaced dorsolaterally by lavender cream extending ventrally over branchiostegites to very pale marginal carina; anteroventral branchiostegal region cream to white. Lateral surface of cephalic section of carapace with large irregular brownish area in hepatic region extending anteriorly as narrow stripe across upper orbital region, remainder pinkish lavender. Abdomen with first abdominal tergum very dark reddish purple, second through fourth segment with rectangular, dark, reddish brown markings along median line, decreasing in size posteriorly to sixth where sublinear, but expanding and forming triangular marking on anterior section of telson; longitudinal stripe extending along dorsal parts of pleura onto anterolateral surface of telson. Anteroventral parts of pleura pale pinkish cream, remainder pinkish tan. Ground color of telson and uropods pale tan with pinkish suffusion, although margins, sutures, and ridges pale brown. Antennular and antennal peduncles reddish brown, flagella tan. Chelipeds basically pinkish lavender with very dark brown dorsal stripe beginning at base of merus and broad-

ening over distal part of podomere; carpus with dark stripes flanking dorsomedian depression and splotches around bases of mesial tubercles; propodus with dark dorsomesial area studded with very dark tubercles; band across distal part of palm extending distolaterally on fixed finger. Dactyl with triangular dark wedge on dorsomesial surface, its fading apex approaching distal end of finger. Second pereopod with merus as in cheliped, and carpus with stripe on dorsal margin and another laterally, chela pale grayish tan. Remaining pereopods with dorsal parts of podomeres from merus distally dark, intensifying at articular margins. Ventral surfaces of all pereopods pale pinkish lavender, especially chela, to cream.

Type-locality.—A swampy area bordering an unnamed tributary of the Saluda River about 1 mile north of State Route 81 on Route 106. There, in an area shaded by *Liriodendron tulipifera*, *Liquidambar styraciflua*, *Alnus rugosa*, *Pinus* sp., and *Quercus* sp., the water table fluctuates from the surface to about 0.8 m below it. The soil is a sandy clay, in some areas rich in humus, and a layer of decaying leaves litters the ground. Chimneys constructed by *Distocambarus* (*F.*) *carlsoni* and *Cambarus* (*J.*) *carolinus* (Erichson, 1846) and a few fallen branches from the overhanging trees are the only conspicuous irregularities in the gently sloping swamp floor. Matted roots of the many trees and shrubs lie at and within a few centimeters below the surface. The colony from which the type-series was obtained occupies an area of some 200 square meters. (See "Ecological Notes" below.)

Disposition of types.—The holotype, allotype, and morphotype are deposited in the National Museum of Natural History (Smithsonian Institution), nos. 178599, 178600, and 178601, respectively, as are the paratypes consisting of 1 male, form I, 13 females, 2 juvenile males, 4 juvenile females, and 1 ovigerous female.

Size.—The largest specimen available is a female having a carapace length of 31.0 mm (postorbital carapace length 27.0 mm); corresponding lengths of the smaller of the two first form males are 25.8 (22.7) mm, and those of the ovigerous female, 27.1 (23.8) mm.

Range and specimens examined.—This crayfish is known from only the type-locality, in the Saluda River basin of South Carolina: Anderson County—(1) type-locality, 1 j♀, 27 Apr 1982, G. B. Hobbs and HHH; 1 ♂II, 1 ♀, 1 ovig. ♀ (carapace length 27.1 mm, carrying 25 eggs with diameters of 2.0 to 2.1 mm), 1 j♂, 2 j♀, 19 Jun 1982, P. H. Carlson; 3 ♀, 22 Oct 1982, PHC; 1 ♀, 1 j♀, 1 Nov 1982, GBH, HHH; 2 ♂I, 9 ♀, 1 j♂ and some 20 very small juveniles which are being maintained alive, 2 Nov 1982, PHC, GBH, HHH.

Relationships.—*Distocambarus* (*Fitzcambarus*) *carlsoni* is a unique crayfish which, while bearing strong resemblances to members of the genus *Cambarus*, does not share several characteristics that typify all of the now recognized species assigned to that genus. The features that are unlike those in any member of *Cambarus* are:

(1) The bent shaft of the first pleopod of the first form male (Figs. 1*b*, *f*). In all members of *Cambarus* it is straight, or at most slightly curved, and the terminal elements, with few exceptions, project from it at no less than 90 degrees. In *D.* (*F.*) *carlsoni*, the shaft is rather strongly reflexed slightly distal to midlength, and the terminal elements are disposed caudally at much less than 90 degrees to the distal segment of the shaft.

(2) A strong caudoproximal lobe on the first pleopod of the first form male (Fig.

1b, f). In most members of *Cambarus* there is hardly a trace of such a lobe, and in none is it nearly so prominent as it is in *D. (F.) carlsoni*.

(3) No boss on the coxa of the fourth pereopods of the first form male (Fig. 1h): In all members of *Cambarus*, a well defined boss is present on the caudomesial angle of the coxa of this appendage; no such swelling is evident in the species described here.

(4) Produced lateral lobe of the sternum associated with the fourth pereopods of the first form male (Fig. 1o). In *Cambarus*, a ventral production of the sternum is inhibited by the presence of a caudomesial boss on the coxa of this appendage; in *D. (F.) carlsoni*, however, the lateral lobes of the sternum are produced ventromesially much beyond the articulation between the coxa and the sternum.

(5) The relative length and width of the carpus of the cheliped (Fig. 1p). In no member of the genus *Cambarus* is the length of the carpus so much greater than its width.

(6) The cleft sternum anterior to the annulus ventralis (Fig. 1n). The narrow suture that lies between the sternal plates associated with the fourth pereopods in *D. (F.) carlsoni* is not evident in any member of the genus *Cambarus*.

(7) The articulation of the annulus ventralis. The hinge-like motion of the annulus ventralis is accomplished between the annulus and the sternum anterior to it rather than, as in *Cambarus*, in a transverse, weakly sclerotized area across the annulus proper.

These differences seem sufficiently significant to conclude that this crayfish is not closely allied to members of any of the subgenera of *Cambarus*. Closer relatives seem to exist in the two members of the genus *Distocambarus*, for both *Distocambarus (D.) devexus* (Hobbs, 1981) and *D. (D.) crockeri* Hobbs and Carlson (1983) exhibit all of the features of *carlsoni* mentioned above. To be sure, there are marked differences in the form of the terminal elements of the first pleopod of the male, and in neither of the previously described species of *Distocambarus* is the central projection so elongate or disposed so distinctly caudally as it is in *D. (F.) carlsoni*. The similarities between the first pleopods of the latter (Fig. 1b, herein) and *D. (D.) crockeri* (see Hobbs and Carlson 1983: fig. 1b) are indeed striking, and a shortening of the shaft of the latter with a concomitant elongation of the central projection and reflection of the central projection would produce an appendage that would be little different from that of *D. (F.) carlsoni*.

The assumption might be made that *Distocambarus (F.) carlsoni* links the genera *Distocambarus* and *Cambarus*. Assuming that the latter contains the more advanced species, if *D. (F.) carlsoni* links the two genera, and if one maintains the current concept of the origin of at least some *Cambarus* from an orconectoid ancestor (see Hobbs 1969), the conclusion might well be reached that the genus *Cambarus* as currently constituted has had a diphyletic origin. In my opinion, the *Cambarus*-like characteristics of *D. (F.) carlsoni* have been acquired independently. If such a conclusion is accepted then the genus *Cambarus* may be assumed to represent a group of species with a more recent common ancestry than any member has had with crayfishes assigned to other groups. But what recognition should be accorded the species described here?

The fact that *D. (F.) carlsoni* shares the list of features just cited with the two species placed in *Distocambarus* by Hobbs and Carlson (loc. cit.) suggests that

assigning it to that genus is appropriate; however, there are several characteristics that set it apart from them: (1) The blade-like central projection on the first pleopod of the first form male. This feature, so strikingly resembling that typical of most members of the genus *Cambarus*, represents an apomorphic (lengthening of the terminal element) departure from the rather shorter and more distally oriented projection in the other two members of *Distocambarus*.

(2) The restricted hinge motion of the annulus ventralis. Whereas in the two members of the subgenus *Distocambarus* the annulus is broadly hinged and swings through an arc of some 90 degrees, that of *Fitzcambarus* has an indistinct, narrow hinge anteriorly, and its arc of motion is no greater than 30 to 40 degrees.

(3) The comparatively small postannular plate. This small wedge-like sclerite bears little resemblance to its conspicuous homologue in the subgenus *Distocambarus*. In the two species belonging to the latter, this plate-like structure may extend anteriorly, covering the posterior part of the depressed annulus ventralis (in *D. (D.) devexus*), or project more ventrally when the annulus is depressed (in *D. (D.) crockeri*); in *D. (F.) carlsoni* it is not plate-like and does not extend so far ventrally as the annulus even when the latter is depressed.

(4) The shorter, proportionately broader chela. The comparatively shorter, broad chela of *D. (F.) carlsoni* is cambaroid, resembling that of members of the subgenus *Depressicambarus*, whereas that of the two members of the nominate subgenus is distinctly procambaroid, possessing an elongate palm and resembling the chelae of certain members of the subgenera *Austrocambarus*, *Girardiella*, and *Ortmannicus*.

(5) The more extreme adaptations to a fossorial habitat. The rostrum of *D. (F.) carlsoni* is decidedly shorter than that in the two species included here in the nominate subgenus; the areola is conspicuously narrower; the abdomen is proportionately smaller, and the pereopods are decidedly more stocky.

As pointed out above, in my opinion, the affinities of this crayfish are clearly with the disjunct species pair that has been assigned to the genus *Distocambarus*. Because of the unique combination of characters demonstrated by his *Procambarus (Distocambarus) devexus*, and believing it to be more closely allied to members of *Procambarus* than to those of other genera, Hobbs (1981) assigned it to that genus and erected for its reception the monotypic subgenus *Distocambarus* signifying its remoteness from other species groups within the genus. With the discovery of a closely allied species, *Distocambarus (D.) crockeri*, Hobbs and Carlson (1983) believed that a better representation of the kinship of these with other crayfishes would be had if *Distocambarus* were elevated to generic rank. Taking cognizance of the unique features that these two crayfishes share, and suggesting the similarities and differences between them and *D. (F.) carlsoni*, I am proposing that the latter be assigned to the monotypic subgenus *Fitzcambarus* within the genus *Distocambarus*.

Ecological notes.—*Distocambarus (F.) carlsoni* is a primary burrower, and I suspect that it is rare that members of the species are found far from one of the mouths of its complex tunnel system. In the type-locality, it shares the low-lying swamp and seepage area with another primary burrower, *Cambarus (Jugicambarus) carolinus* (Erichson, 1846:87), but the two seem to have partitioned the area on the basis of comparatively static and flowing groundwater. The occurrence of the latter species in the swampy area may well be limited to sections

where there is an active movement of the ground water, at least some of which emerges to the surface and flows toward the nearby creek; indeed, on 2 November 1982, water was issuing from the mouths of the tunnels of two of the specimens obtained, and the other two individuals were taken from burrows out of which water trickled when they were opened. There on the eastern periphery of the swamp, the land rises more abruptly than on the more gentle slope where the burrows of *Distocambarus (F.) carlsoni* were found. One to three openings which are often surrounded by irregular piles of earthen pellets mark the domiciles of the latter crayfish. There seems to be no pattern to the configuration of the complex system of galleries, and no doubt any model that might have been instituted would have been modified through necessity by the mats of roots of trees among which the resulting tunnels are entwined. In most burrows, horizontal passageways radiate irregularly from one or two vertical tunnels that are sufficiently deep to penetrate the water table. Side passages that end blindly may extend in almost any direction from the principal galleries. As in burrows of most crayfishes that spend the greater part of their lives in the soil, those inhabited by females are more highly branched than those occupied by males.

Both of the burrowing crayfishes found at this locality are infested with entocytherid ostracods. *Cambarus (J.) carolinus* harbors only one species, *Harpagocythere georgiae* Hobbs III (1965:163), whereas *Distocambarus (F.) carlsoni* is infested with two more wide ranging ones, *Ankylocythere ancyla* Crawford (1965:148) and *Entocythere dorsorotunda* Hoff (1944:332). The latter two ostracods have been found on a number of different crayfishes, but *H. georgiae*, which has been reported from a single locality, was obtained from a collection containing *C. (J.) carolinus* and *C. (Depressicambarus) latimanus* (LeConte, 1856). In the latter instance, whether or not both crayfishes bore this commensal is not known. Perhaps its host is limited to *C. (J.) carolinus*, the habitat of which is much more restricted than that of *C. (D.) latimanus*, a crayfish that tolerates a wide range of ecological conditions existing from the panhandle of Florida northward to northern North Carolina.

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